

C) Projector setup values:

The following chart contains Overscan setup details, based on visual matching of picture content.

LOW GANG					
	Top (line)	Bottom (line)	Left (sample)	Right (sample)	Displays
1035	58 (620)	545 (1108)	252	2076	REF., 1080I unconverted, 720P converted
720	73	770	244	1478	720P unconverted,

HIGH GANG					
	Top (line)	Bottom (line)	Left (sample)	Right (sample)	Displays
1035	58 (620)	545 (1108)	252	2076	REF.
720	99	754	220	1440	1080I converted

For Low Gang, the 720 display setup was quite close to nominal 787 format 5% overscan. Vertically, the image has been shifted downward by 6 lines, and squeezed by about 0.5%. Horizontally, the image has been shifted leftward by about 7 samples, and a very slight (0.1%) stretch has been applied.

For High Gang, vertical adjustments include both a downward image shift of approximately 32 lines, and an image stretch of 5.5%. Horizontally, the image has been shifted to the right by about 16 samples, and a 1.2% stretch has been applied.

The 1035 values for both Low and High Gang are very close to nominal 1125 format 5% overscan.

ATEL EXPERT TECHNICAL REVIEW OF 1080I UNCONVERTED TEST MATERIAL

A) General comments:

All 1080I unconverted Test sequences originated from 1035I sources. These 1035I sources were then 'padded' with 40 additional lines of active video at the top of frame, and 5 lines of video black at the bottom of frame. The resulting 1080I video was then input into the GA system. The 1080I system output was then stripped of the top 40 and bottom 5 lines, resulting in a 1035I format for storage and display purposes.

All 1080I unconverted Test sequences contain incongruous picture information in the first line of the active picture portion. This line of video information appears to be drawn from approximately 40 lines lower. This is a vestige of the conversion from 1080 lines to 1035 lines.

A slight reduction in image crispness has been noted for all of the Test pictures.

Where moderate luminance noise is present in a Test picture, this noise can be seen to pulsate.

B) Picture specific comments:

	ID	NAME	1035I REF.	1080I UNCONVERTED TEST
1	S1	METAL TABLE & CHAIRS	-highly detailed surfaces.	-slight loss in resolution noted with respect to finer image detail, even if system 'peaking' generally makes image look as crisp as the Reference.
2	M16A	ROTATING PYRAMIDS	-interlace twitter on scrolling text and fine horizontal lines of left rear column. -very mild moiré visible on rotating magenta and red pyramids.	-general decrease in picture resolution. -text twitter greatly dampened. -strong moiré in red and magenta pyramids. -high chroma noise in red and magenta. -mild blocking in certain areas of background clouds. -second line of picture (in overscan) is black.

3	M40	DREAM TEAM	<ul style="list-style-type: none"> -rapid camera motion causes area of spectators to occasionally blur. -large instantaneous changes in luminance levels caused by frequent photo flashes. -several lingering camera burn ins, also caused by photo flashes. 	<ul style="list-style-type: none"> -blocking clearly visible over large areas of screen, and particularly in reds in periods of high motion. -blocking is frequent in response to photo flashes.
4	M43	DUCKS	<ul style="list-style-type: none"> -mild green fringing visible. 	<ul style="list-style-type: none"> -minor contour artifacts along necks of swans. -minor blocking at surface of water. -green fringing somewhat enhanced.
5	M49	PICNIC WITH ANTS	<ul style="list-style-type: none"> -still image with encroaching noise. -interlace twitter along folded edges of paper napkins. 	<ul style="list-style-type: none"> -blocking artifacts are clearly visible as the noise content is increased; by end of sequence image is composed entirely of blocks. -color coding errors exist at some object boundaries. -encroaching noise becomes increasingly correlated.
6	S14A	CHESHIRE CAT	<ul style="list-style-type: none"> -short green/white static 'streaks' observed between vases. -twitter in smaller distant checkerboard pattern. 	<ul style="list-style-type: none"> -visibility of static 'streaks' very slightly reduced. -checkerboard twitter dampened. -small increase in ringing (or fringing) along edges of foreground checkerboard tiles. -second line of picture (in overscan) is black. -slight overall reduction in picture resolution.

ATEL EXPERT TECHNICAL REVIEW OF 1080I CONVERTED TEST MATERIAL

A) General comments:

All 1080I converted Test sequences originated from 1035I sources. These 1035I sources were then 'padded' with 40 additional lines of active video at the top of frame, and 5 lines of video black at the bottom of frame. The resulting 1080I video was then input into the GA system. The 1080I system output was then transconverted to 720P format for storage and display purposes.

All 1080I converted Test sequences contain approximately 27 lines of video 'padding' at the top of each frame, since the 1080I system output was not stripped back down to 1035I before transconversion to 720P. This superfluous video was not visible to viewers when displayed on the appropriate projector setup.

A slight reduction in image crispness is noted for all of the Test images.

Where moderate luminance noise is present in a Test picture, it could be seen to pulsate.

B) Picture specific comments:

	ID	NAME	1035I REF.	1080I CONVERTED TEST
1	S1	METAL TABLE & CHAIRS	-highly detailed surfaces.	-slight loss in resolution noted with respect to finer image detail, even if system 'peaking' generally makes image look as crisp as the Reference.
2	M16A	ROTATING PYRAMIDS	-interlace twitter on scrolling text and fine horizontal lines of left rear column. -very mild moiré visible on rotating magenta and red pyramids.	-general decrease in picture resolution. -strong moiré in red and magenta pyramids. -high chroma noise in red and magenta. -mild blocking in certain areas of background clouds. -fine upwardly scrolling horizontal lines visible.
3	M40	DREAM TEAM	-rapid camera motion causes area of spectators to occasionally blur. -large instantaneous changes in luminance levels caused by frequent photo flashes. -several lingering camera burn ins, also caused by photo flashes.	-blocking clearly visible over large areas of screen, and particularly in reds, in periods of high motion. -blocking is frequent in response to photo flashes.

4	M43	DUCKS	-mild green fringing visible.	-minor contour artifacts along necks of swans. -minor blocking at surface of water. -green fringing somewhat enhanced.
5	M49	PICNIC WITH ANTS	-still image with encroaching noise. -interlace twitter along folded edges of paper napkins.	-blocking artifacts are clearly visible as the noise content is increased; by end of sequence image is composed entirely of blocks. -color coding errors exist at some object boundaries. -encroaching noise becomes increasingly correlated. -fine upwardly scrolling horizontal lines are visible until overwhelmed by blocking artifacts.
6	S14A	CHESHIRE CAT	-short green/white static 'streaks' observed between vases. -twitter in smaller distant checkerboard pattern.	-visibility of static 'streaks' very slightly reduced. -reduced resolution in distant checkerboard pattern. -very small increase in ringing (or fringing) along vertical edges of foreground checkerboard tiles. -slight overall reduction in picture resolution.

ATEL EXPERT TECHNICAL REVIEW OF 720P UNCONVERTED TEST MATERIAL

A) General comments:

The 720P unconverted Test sequences 'Metal Table and Chairs', 'Rotating Pyramids' and 'Picnic with Ants' originated from 720P sources. These 720P sources were input into the GA system. The 720P system output that resulted was used for storage and display purposes.

The 720P unconverted Test sequences 'Dream Team', 'Ducks', 'Den' and 'Woman in Room' originated from 720P sources that had been previously transconverted from 1035I, with a resultant 2.2% image vertical stretch and crop. These 720P sources were then input into the GA system. The 720P system output that resulted was used for storage and display purposes.

All GA processed images exhibit a slight color shift towards yellow/green.

All GA processed images appear to have approximately 2.5% of the image clipped along the right hand side.

No accurate match is possible with respect to display size and positioning for the image 'Rotating Pyramids' due to inherent geometric differences between 1035I and 720P sources.

Where moderate luminance noise is present in a TEST picture, this noise can be seen to pulsate.

B) Picture specific comments:

	ID	NAME	1035I REF.	720P UNCONVERTED TEST
1	S1	METAL TABLE & CHAIRS	-a small piece of red tape on the arm of one chair appears only on the Reference version of this picture; based on interfield differences, this may represent a data conversion error.	-slight shift in color noted. -slight loss in resolution noted with respect to finer image detail, even if system 'peaking' generally makes image look as crisp as the Reference.
2	M16A	ROTATING PYRAMIDS	-interlace twitter on scrolling text and fine horizontal lines of left rear column. -very mild moiré visible on rotating magenta and red pyramids.	-clear decrease in overall picture crispness. -increased chroma noise in red and magenta pyramids. -contour artifacts noted around characters of scrolling text. -fine upwardly scrolling horizontal lines visible.

3	M40	DREAM TEAM	<ul style="list-style-type: none"> -rapid camera motion causes area of spectators to occasionally blur. -large instantaneous changes in luminance levels caused by frequent photo flashes. -several lingering camera burn ins, also caused by photo flashes. 	<ul style="list-style-type: none"> -blocking clearly visible over large areas of screen, and particularly in reds, in periods of high motion. -blocking is frequent in response to photo flashes. -color contouring artifacts observed.
4	M43	DUCKS	<ul style="list-style-type: none"> -mild green fringing visible. 	<ul style="list-style-type: none"> -minor contour artifacts along necks of swans and other vertical edges. -mild blocking at surface of water, and necks of some swans. -green fringing somewhat enhanced. -general loss in image crispness.
5	M49	PICNIC WITH ANTS	<ul style="list-style-type: none"> -still image with encroaching noise. -interlace twitter along folded edges of paper napkins. 	<ul style="list-style-type: none"> -blocking artifacts are clearly visible as the noise content is increased; by end of sequence image is composed entirely of blocks. -color coding errors exist at many object boundaries. -encroaching noise becomes increasingly correlated. -both the noise and blocking artifacts can be seen to pulsate.
6	M6	DEN	<ul style="list-style-type: none"> -this image is slightly soft, with moderate amounts of camera noise. 	<ul style="list-style-type: none"> -mild increase in visibility of noise. -busyness in wicker furniture and wallpaper. -fine upwardly scrolling horizontal lines visible. -color contouring artifacts observed.
7	M10	WOMAN AND ROOM	<ul style="list-style-type: none"> -mild to moderate level of camera noise. -horizontal luminance bands clearly visible on face. 	<ul style="list-style-type: none"> -increase in visibility of noise. -red spine of book at start of sequence is very noisy. -busyness in wicker furniture and wallpaper. -fine upwardly scrolling horizontal lines visible.

ATEI EXPERT TECHNICAL REVIEW OF 720P CONVERTED TEST MATERIAL

A) General comments:

The 720P converted Test sequences 'Metal Table and Chairs', 'Rotating Pyramids' and 'Picnic with Ants' originated from 720P sources. These 720P sources were then input into the GA system. The 720P system output was then transconverted to 1080I format, and then stripped of the top 40 and bottom 5 lines, resulting in a 1035I format for storage and display purposes.

The 720P converted Test sequences 'Dream Team', 'Ducks', 'Den' and 'Woman in Room' originated from 720P sources that had been previously transconverted from 1035I, with a resultant 2.2% image vertical stretch and crop. These 720P sources were then input into the GA system. The 720P system output was then transconverted to 1080I format, and then stripped of the top 40 and bottom 5 lines, resulting in a 1035I format for storage and display purposes.

All GA processed images exhibit a slight color shift towards yellow/green.

All GA processed images appear to have approximately 2.5% of the image clipped along the right hand side.

No accurate match is possible with respect to display size and positioning for the image 'Rotating Pyramids' due to inherent geometric differences between 1035I and 720P sources.

Where moderate luminance noise is present in a Test picture, this noise can be seen to pulsate.

B) Picture specific comments:

	ID	NAME	1035I REF.	720P CONVERTED TEST
1	S1	METAL TABLE & CHAIRS	-a small piece of red tape on the arm of one chair appears only on the Reference version of this picture; based on interfield differences, this may represent a data conversion error.	-slight shift in color noted. -slight loss in resolution noted with respect to finer image detail, even if system 'peaking' generally makes image look as crisp as the Reference.
2	M16A	ROTATING PYRAMIDS	-interlace twitter on scrolling text and fine horizontal lines of left rear column. -very mild moiré visible on rotating magenta and red pyramids.	-clear decrease in overall picture crispness. -increased chroma noise in red and magenta pyramids. -contour artifacts noted around characters of scrolling text. -very mild blocking observed in some areas of background clouds.

3	M40	DREAM TEAM	<ul style="list-style-type: none"> -rapid camera motion causes area of spectators to occasionally blur. -large instantaneous changes in luminance levels caused by frequent photo flashes. -several lingering camera burn ins, also caused by photo flashes. 	<ul style="list-style-type: none"> -blocking clearly visible over large areas of screen, and particularly in reds, in periods of high motion. -blocking is frequent in response to photo flashes. -color contouring artifacts observed. -some ringing noted along vertical edges.
4	M43	DUCKS	<ul style="list-style-type: none"> -mild green fringing visible. 	<ul style="list-style-type: none"> -minor contour artifacts along necks of swans and other vertical edges. -mild blocking at surface of water, and necks of some swans. -green fringing somewhat enhanced. -general loss in image crispness. -some ringing noted along vertical edges.
5	M49	PICNIC WITH ANTS	<ul style="list-style-type: none"> -still image with encroaching noise. -interlace twitter along folded edges of paper napkins. 	<ul style="list-style-type: none"> -blocking artifacts are clearly visible as the noise content is increased; by end of sequence image is composed entirely of blocks. -color coding errors exist at many object boundaries. -encroaching noise becomes increasingly correlated. -both the noise and blocking artifacts can be seen to pulsate.
6	M6	DEN	<ul style="list-style-type: none"> -this image is slightly soft, with moderate amounts of camera noise. 	<ul style="list-style-type: none"> -clearly visible vertical moiré on jacket. -mild increase in visibility of noise. -busyness in wicker furniture and wallpaper. -some ringing noted along vertical edges. -mild contouring artifacts observed.
7	M10	WOMAN AND ROOM	<ul style="list-style-type: none"> -mild to moderate level of camera noise. -horizontal luminance bands clearly visible on face. 	<ul style="list-style-type: none"> -increase in visibility of noise. -red spine of book at start of sequence is very noisy. -busyness in wicker furniture and wallpaper. -vertically aligned moiré noted on CDs in shelf, and on cushion of sofa when it moves.

RECEIVER SCAN CONVERSION
PICTURE DESCRIPTION

- S1 Metal Tables & Chairs: Overhead view of round tables and chairs on concrete patio stones.
- S14A Cheshire Cat: Three potted plants with Christmas balls, on black and white checkered floor.
- M6 Den: Man getting book off shelf, and sitting on sofa.
- M10 Woman & Room: Woman in green, blue and black argyle sweater getting book, and sitting on sofa.
- M16A Rotating Pyramids: Silver mobile with 4 diamonds spinning, on marble background, with text.
- M40 Dream Team: Basketball game.
- M43 Ducks: Lots of ducks and swans swimming in pond.
- M49 Picnic: Four people at picnic table; still with encroaching noise.

RANDOMIZATION OF RECEIVER SCAN CONVERSION TEST MATERIAL

The randomization of test material is undertaken to minimize the occurrence of any patterns in the presentation of video sequences and, ideally, eliminate any related viewer bias. Each Tape Order consists of all test sequences arranged in a pseudo-random fashion. Within each Tape Order, limits are set as to the proximity of identical video sequences, and as to the number of consecutive identical test conditions (Ref.-Test, Test-Ref.), picture attributes (motion / still), and picture sources (film, computer graphic, video camera). The objective is to achieve an overall balance of the foregoing factors. Where cumulative playout time exceeds the storage capacity of a single videotape reel, the randomized video sequences are evenly distributed over two playback tapes, A and B. To guard against unpredicted contextual effects, a second distinct randomization of the test material is also generated. Test results for both randomized Tape Orders, 1 and 2, can then be compared.

Tapes played back for Receiver Scan Conversion, tapes 1A and B were ATTC LICS. codes 11286 - 11288, respectively, and 11287 - 11290, for tapes 2A and B, respectively.

RECEIVER SCAN CONVERSION RANDOMIZATION FOR ORDER 1, TAPE A

RSC Order 1A							
Type		Picture Name	Picture Number	Test Condition	Test Mode	Source Video	Output Video
Demo	1	Memorial Arch	S10	R-T	1080D	1080	1080
Demo	2	Rollercoaster	M42	T-R	1080C	1080	720
Demo	3	Fruits & Vegetables	S7	R-T	720C	720	1080
Demo	4	Memorial Arch	S10	T-R	720D	720	720
Cue Stop		50% Grey					
Warm Up	1	Woman in Room	M10	R-T	720D	720	720
Warm Up	2	Metal Tables & Chairs	S1	T-R	1080C	1080	720
Warm Up	3	Ducks	M43	R-T	720C	720	1080
Warm Up	4	Picnic with Ants	M49	T-R	1080D	1080	1080
Warm Up	5	Den	M6	R-T	720C	720	1080
Trial	1	Woman in Room	M10	R-T	720 C	720	1080
Trial	2	Rotating Pyramids	M16A	T-R	1080 C	1080	720
Trial	3	Picnic with Ants	M49	R-T	720 D	720	720
Trial	4	Ducks	M43	R-T	1080C	1080	720
Trial	5	Rotating Pyramids	M16A	T-R	720 D	720	720
Trial	6	Picnic with Ants	M49	T-R	1080 D	1080	1080
Trial	7	Ducks	M43	R-T	1080 D	1080	1080
Trial	8	Metal Table & Chairs	S1	T-R	1080 D	1080	1080
Trial	9	Cheshire Cat	S14A	T-R	1080 C	1080	720
Trial	10	Picnic with Ants	M49	R-T	1080 C	1080	720
Trial	11	Ducks	M43	T-R	720C	720	1080
Trial	12	Woman in Room	M10	T-R	720 D	720	720
Trial	13	Den	M6	T-R	720 C	720	1080
Trial	14	Dream Team	M40	R-T	720 C	720	1080
Trial	15	Metal Table & Chairs	S1	R-T	720 D	720	720
Trial	16	Picnic with Ants	M49	R-T	720 C	720	1080
Trial	17	Cheshire Cat	S14A	T-R	1080 D	1080	1080
Trial	18	Den	M6	R-T	720 D	720	720
Trial	19	Dream Team	M40	R-T	720D	720	720
Trial	20	Picnic with Ants	M49	T-R	720 C	720	1080
Trial	21	Metal Table & Chairs	S1	R-T	720 C	720	1080
Trial	22	Rotating Pyramids	M16A	R-T	1080D	1080	1080
Trial	23	Dream Team	M40	T-R	1080 C	1080	720

RECEIVER SCAN CONVERSION RANDOMIZATION FOR ORDER 1, TAPE B

RSC Order 1B							
Type		Picture Name	Picture Number	Test Condition	Test Mode	Source Video	Output Video
Warm Up	6	Rotating Pyramids	M16A	R-T	1080D	1080	1080
Warm Up	7	Dream Team	M40	T-R	720C	720	1080
Warm Up	8	Cheshire Cat	S14A	R-T	1080D	1080	1080
Trial	24	Den	M6	T-R	720 D	720	720
Trial	25	Metal Table & Chairs	S1	T-R	1080 C	1080	720
Trial	26	Rotating Pyramids	M16A	R-T	720 C	720	1080
Trial	27	Woman in Room	M10	R-T	720 D	720	720
Trial	28	Dream Team	M40	R-T	1080C	1080	720
Trial	29	Rotating Pyramids	M16A	T-R	720 C	720	1080
Trial	30	Ducks	M43	T-R	720 D	720	720
Trial	31	Den	M6	R-T	720 C	720	1080
Trial	32	Metal Table & Chairs	S1	R-T	1080 D	1080	1080
Trial	33	Ducks	M43	R-T	720 D	720	720
Trial	34	Picnic with Ants	M49	T-R	1080 C	1080	720
Trial	35	Dream Team	M40	T-R	1080 D	1080	1080
Trial	36	Ducks	M43	T-R	1080 C	1080	720
Trial	37	Cheshire Cat	S14A	R-T	1080 C	1080	720
Trial	38	Metal Table & Chairs	S1	R-T	1080 C	1080	720
Trial	39	Picnic with Ants	M49	T-R	720 D	720	720
Trial	40	Ducks	M43	R-T	720 C	720	1080
Trial	41	Dream Team	M40	R-T	1080 D	1080	1080
Trial	42	Metal Table & Chairs	S1	T-R	720 C	720	1080
Trial	43	Rotating Pyramids	M16A	T-R	1080 D	1080	1080
Trial	44	Ducks	M43	T-R	1080D	1080	1080
Trial	45	Dream Team	M40	T-R	720 C	720	1080
Trial	46	Picnic with Ants	M49	R-T	1080 D	1080	1080
Trial	47	Cheshire Cat	S14A	R-T	1080D	1080	1080
Trial	48	Rotating Pyramids	M16A	R-T	720 D	720	720
Trial	49	Woman in Room	M10	T-R	720 C	720	1080
Trial	50	Metal Table & Chairs	S1	T-R	720 D	720	720
Trial	51	Dream Team	M40	T-R	720 D	720	720
Trial	52	Rotating Pyramids	M16A	R-T	1080C	1080	720

RECEIVER SCAN CONVERSION RANDOMIZATION FOR ORDER 2, TAPE A

RSC Order 2A							
Type		Picture Name	Picture Number	Test Condition	Test Mode	Source Video	Output Video
Demo	1	Memorial Arch	S10	R-T	1080D	1080	1080
Demo	2	Rollercoaster	M42	T-R	1080C	1080	720
Demo	3	Fruits & Vegetables	S7	R-T	720C	720	1080
Demo	4	Memorial Arch	S10	T-R	720D	720	720
Cue Stop		50% Grey					
Warm Up	1	Woman in Room	M10	R-T	720D	720	720
Warm Up	2	Metal Table & Chair	S1	T-R	1080C	1080	720
Warm Up	3	Ducks	M43	R-T	720C	720	1080
Warm Up	4	Picnic with Ants	M49	T-R	1080D	1080	1080
Warm Up	5	Den	M6	R-T	720C	720	1080
Trial	1	Dream Team	M40	T-R	1080 C	1080	720
Trial	2	Metal Table & Chairs	S1	R-T	720 C	720	1080
Trial	3	Den	M6	T-R	720 C	720	1080
Trial	4	Rotating Pyramids	M16A	T-R	720 D	720	720
Trial	5	Dream Team	M40	T-R	720C	720	1080
Trial	6	Picnic with Ants	M49	R-T	1080 C	1080	720
Trial	7	Cheshire Cat	S14A	T-R	1080 C	1080	720
Trial	8	Metal Table & Chairs	S1	T-R	720 D	720	720
Trial	9	Dream Team	M40	R-T	1080 D	1080	1080
Trial	10	Rotating Pyramids	M16A	R-T	1080 D	1080	1080
Trial	11	Picnic with Ants	M49	R-T	720 D	720	720
Trial	12	Ducks	M43	T-R	720 D	720	720
Trial	13	Rotating Pyramids	M16A	T-R	720C	720	1080
Trial	14	Picnic with Ants	M49	R-T	1080D	1080	1080
Trial	15	Woman in Room	M10	R-T	720 C	720	1080
Trial	16	Metal Table & Chairs	S1	T-R	1080D	1080	1080
Trial	17	Ducks	M43	T-R	1080 C	1080	720
Trial	18	Dream Team	M40	R-T	720 D	720	720
Trial	19	Den	M6	T-R	720 D	720	720
Trial	20	Cheshire Cat	S14A	T-R	1080 D	1080	1080
Trial	21	Picnic with Ants	M49	T-R	720C	720	1080
Trial	22	Ducks	M43	R-T	720C	720	1080
Trial	23	Metal Table & Chairs	S1	R-T	1080 C	1080	720

RECEIVER SCAN CONVERSION RANDOMIZATION FOR ORDER 2, TAPE B

RSC Order 2B							
Type		Picture Name	Picture Number	Test Condition	Test Mode	Source Video	Output Video
Warm Up	6	Rotating Pyramids	M16A	R-T	1080D	1080	1080
Warm Up	7	Dream Team	M40	T-R	720C	720	1080
Warm Up	8	Cheshire Cat	S14A	R-T	1080D	1080	1080
Trial	24	Ducks	M43	R-T	1080 C	1080	720
Trial	25	Picnic with Ants	M49	T-R	720 D	720	720
Trial	26	Rotating Pyramids	M16A	R-T	1080 C	1080	720
Trial	27	Woman in Room	M10	T-R	720 D	720	720
Trial	28	Dream Team	M40	T-R	1080D	1080	1080
Trial	29	Ducks	M43	R-T	720 D	720	720
Trial	30	Woman in Room	M10	R-T	720 D	720	720
Trial	31	Picnic with Ants	M49	T-R	1080 C	1080	720
Trial	32	Metal Table & Chairs	S1	T-R	1080C	1080	720
Trial	33	Rotating Pyramids	M16A	T-R	1080D	1080	1080
Trial	34	Cheshire Cat	S14A	R-T	1080 D	1080	1080
Trial	35	Den	M6	R-T	720 C	720	1080
Trial	36	Ducks	M43	R-T	1080 D	1080	1080
Trial	37	Picnic with Ants	M49	T-R	1080 D	1080	1080
Trial	38	Woman in Room	M10	T-R	720 C	720	1080
Trial	39	Metal Table & Chairs	S1	R-T	720 D	720	720
Trial	40	Cheshire Cat	S14A	R-T	1080C	1080	720
Trial	41	Picnic with Ants	M49	R-T	720 C	720	1080
Trial	42	Dream Team	M40	T-R	720D	720	720
Trial	43	Rotating Pyramids	M16A	R-T	720 D	720	720
Trial	44	Ducks	M43	T-R	1080 D	1080	1080
Trial	45	Metal Table & Chairs	S1	R-T	1080 D	1080	1080
Trial	46	Rotating Pyramids	M16A	T-R	1080 C	1080	720
Trial	47	Dream Team	M40	R-T	1080 C	1080	720
Trial	48	Ducks	M43	T-R	720 C	720	1080
Trial	49	Den	M6	R-T	720D	720	720
Trial	50	Rotating Pyramids	M16A	R-T	720 C	720	1080
Trial	51	Metal Tables & Chairs	S1	T-R	720 C	720	1080
Trial	52	Dream Team	M40	R-T	720 C	720	1080

APPENDIX D
CORRESPONDENCE

**ADVANCED TELEVISION
TEST CENTER, INC.**

SWP2-1462
25 July 95

1330 BRADDOCK PLACE SUITE 200 ALEXANDRIA, VIRGINIA 22314-1650
703/739-3850 FAX 703/739-3230

July 25, 1995

Mr. Mark Richer
SS/WP-2 Chairman, FCC Advisory
Committee on Advanced Television Service
c/o Public Broadcasting Service
1320 Braddock Place
Alexandria, Virginia 22314

Dear Mark:

This letter is to advise you of an anomaly in the test results for Upper Adjacent Channel ATV-into-NTSC interference, which we noted at the time of the original test and investigated further at the end of the Grand Alliance test period, and for which we now offer a recommendation to SS/WP-2.

A disparity exists between the median CCIR Grade 3 level determined by expert viewers at ATTC and the Grade 3 level resulting from the non-expert assessment at ATEL. At the Strong (-25 dBm) level of the desired NTSC signal, the ATEL Grade 3 occurs at a 3.5-dB lower level of interference than the ATTC Grade 3. At the Weak (-55 dBm) level of the NTSC signal, the ATEL Grade 3 occurs at a 6.8-dB lower level. In both cases, the CCIR 3 level voted by the experts as the median for the 24 receivers was beyond the range of levels they selected, using a single "median" receiver, for non-expert viewing at ATEL. Therefore, the ATEL results could not possibly have matched the ATTC results. In both cases, however, the individual CCIR 3 levels voted by the experts for that receiver ("B5") were in close agreement with the ATEL results, which were based upon recordings made from that receiver. At the Strong NTSC level, the two results were 0.5 dB apart; at the Weak level, the results were 1.8 dB apart. Based upon this analysis of the data, we hypothesized that the disparity was most likely due to the fact that the selected "median" receiver was not sufficiently representative of the bank of 24 receivers.

Last week, at the conclusion of Grand Alliance testing, we set up the test conditions again in order to investigate our hypothesis. A representative of the Grand Alliance was present during this investigation. We confirmed, by "live-versus-tape" A/B comparison, that the recordings used in the ATEL testing had correctly captured the performance of the "median" receiver (B5) at each of the selected ranging levels. We also noted that, especially at the Weak level, the performance of this receiver was not representative of the median performance of the bank of 24 receivers over the full range from Threshold of Visibility (TOV) to Point of Unusability (POU). This

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observation was confirmed by further analysis of the expert voting results. Specifically, at Weak, the TOV for Receiver B5 was nearly 3 dB better than the median TOV, while at POU, the TOV for B5 was 3 dB worse than the median TOV. At the CCIR 3 level, that receiver was 5 dB worse than the median. However, given the constraints involved in selecting a "median" receiver, we found that B5 had been the best choice available. (One constraint is that only six receivers have baseband video outputs available for recording. Also, on several of these receivers, under the upper-adjacent channel interference condition, the appearance of the impairment on the screen differs significantly from the appearance of the baseband output as displayed on the large-screen NTSC monitor—*i.e.* one matching the monitor used at ATEL—thus further limiting the number of receivers suitable for recording.)

After discussion of this finding with ATEL and with representatives of the Grand Alliance, it is our recommendation that the ATEL results for this test be set aside in favor of the experts' results.

In a separate letter to you this date, I have reported results of supplemental testing for degradation of BTSC audio in the presence of Upper Adjacent Channel ATV interference. Those results show that the audio impairment precedes the CCIR 3 video impairment, thereby rendering the subjective video test results of less importance to the spectrum planning process.

Sincerely,



Thomas M. Gurley
Director of Testing

cc: Richard Citta, Zenith/Grand Alliance
Metin Akgun, ATEL
Robert Bromery, FCC

ADVANCED TELEVISION TEST CENTER, INC.

SSWP2-1465
25 July 95

1330 BRADDOCK PLACE SUITE 200 ALEXANDRIA, VIRGINIA 22314-1650
703/739-3850 FAX 703/739-3230

July 25, 1995

Mr. Mark Richer
Chairman, SS/WP-2
FCC Advisory Committee on
Advanced Television Service
c/o Public Broadcasting Service
1320 Braddock Place
Alexandria, Virginia 22314

Dear Mark:

This letter provides a description of the matter involving six of the twenty-six images used as the 'reference' in the Basic Quality testing of the progressive format of the Grand Alliance HDTV System. Actions were taken to address the matter before the tests were conducted, and those actions are detailed below. For background please recall that these tests are conducted by the Advanced Television Evaluation Laboratory (ATEL) with non-expert viewers who are asked to compare a 'reference' image (1035-active line studio source) with a 'test' image of the same picture. The tests use 'randomized' video tapes supplied by ATTC, which provide a series of 'reference vs. test' images for this comparison.

In reviewing the video tapes prepared by ATTC before this testing began, it was determined that these six images, which are in the interlaced format, had incorrect colorimetry and, therefore, did not match the colorimetry of the same images in the progressive format which were the source for creating the progressive test picture. These six 'still' images are those generated via the PIXAR computer imaging device, whose analog output is recorded onto digital high definition video tape for use in the tests. It appears that, in the primary recording process of one tape, the color shift occurred either in the A/D conversion between out- and inputs of the PIXAR and the HD-DVTR, and/or in a misadjusted format convertor between the two machines.

In creating the 'master' tape of all reference images to be used in this test, these six images were derived from this wrong tape source—one made in 1991, at approximately the same time as when the correct source tape was made. The correct source tape is the 'interlaced format master' tape from 1991, which was used in the original round of testing, and which has the proper colorimetry matching the contemporaneously created progressive scan version of these same images. The wrong tape was used to assemble the master tape because its longer (30-second) sequences made the assembly editing easier, but in the mistaken belief that its colorimetry was correct.

Upon discovery of the situation, when the color mismatch was noted between the reference and the test images, discussions among Grand Alliance, ATTC and ATEL representatives, and then with your review, determined that ATTC should attempt to 'extract' the incorrect colorimetry by trying to reverse the color shift process using the adjustments (Y, Pr, Pb) on the format converter. Efforts over nearly a day did not succeed in establishing common criteria for doing this for all six images; so, it is believed that the problem arose from a combination of sources in the original recording of that one tape. At the proposal of the Grand Alliance, an attempt was also made to pass the incorrect, color-shifted interlaced image through the Grand Alliance system's receiver scan-converter

(interlaced in/progressive out), thereby seeking a new, 'color matched' progressive image which could replace the already correct, but not matched progressive source image. This did not succeed as the system hardware--which was built to manage this scan conversion in the all-digital mode--could not readily be re-configured to accept an R, G, B baseband input of the interlaced image.

Therefore, after further discussion among the parties, and with your approval, it was determined that the six incorrect reference images on the tapes to be used at ATEL should be replaced with the correct ones (i.e. with proper colorimetry), and that the correct progressive scan versions of these images be re-recorded through the Grand Alliance system and also be used. (Note: These progressive scan images were those used in the first round of testing; and they replaced ones which, while properly color matched to the correct ones, had been taken from another 1991 version of the progressive test materials.) Therefore, these corrections were made to the sets (reference and test) of the six images wherever they occurred on the randomized tapes for use at ATEL.

It should be noted that this solution means that these six images now used in the progressive scan Basic Quality test are not the same as those (incorrect colorimetry) ones used as reference and as source in the interlaced scan Basic Quality test. While it is not believed by the parties that this will affect the respective test results in either format's Basic Quality--inasmuch as all input images are, in fact, now properly color matched--this fact must be noted in a review and comparison of the two formats' results. Although not a comparison contemplated by the Test Plan, this distinction will be noted by ATTC and ATEL in their respective reports; and it should be noted in any later presentation of the results.

Sincerely,



Thomas M. Gurley
Director of Testing

cc: Paul Hearty, GI/Grand Alliance
Metin Akgun, ATEL

APPENDIX E

SUMMARY OF RESPONSES TO

BASIC RECEIVED QUALITY QUESTIONNAIRES

BASIC RECEIVED QUALITY

1080I

RESPONSES TO QUALITY QUESTIONNAIRE

1. Did you see differences in picture quality between Presentation "A" and Presentation "B"?

YES ☐NO ☐

RESULTS: Answer (number of viewers, of 27)

YES (25)

NO (2)

If yes, please describe the kinds of differences you observed. Please refer to specific pictures whenever possible.

RESULTS: Observations (number of instances reported)

Clarity/Sharpness

Unspecified	(4)	Woman in Room	(1)	Tulips	(1)
Mannequin	(4)	Rotating Pyramids	(1)	Fax Machine	(7)
Buckingham Palace	(3)	Clock	(1)	Golf	(1)
Snow Tires	(3)	Crosswalk	(1)	Dream Team	(5)
Picnic with Ants	(2)	Mirror	(3)	End Zone	(2)
Window	(1)	Living Room	(1)	Christa	(3)

Color Quality

Unspecified	(2)	Toys	(1)	Crosswalk	(1)
Dream Team	(1)	Picnic with Ants	(2)	End Zone	(1)

Brightness/Contrast

Unspecified	(3)	Tulips	(1)	Mannequin	(1)
Clock	(1)	Crosswalk	(1)	Dream Team	(2)
Picnic with Ants	(1)	Christa	(1)	Fountain	(1)
Sculptures	(1)				

Motion Rendition

Dream Team	(1)	End Zone	(2)
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Miscellaneous Artifacts

<u>Life Like Images</u>		<u>Distortion</u>		<u>Camera Burn In</u>	
Crosswalk	(1)	Unspecified	(1)	Fax Machine	(2)
		Dream Team	(1)		

Flickers

Unspecified	(1)	<u>Blocking</u>	
End Zone	(1)	Unspecified	(1)
Mannequin	(1)	Picnic with Ants	(5)

Unspecified

Dream Team	(1)	Buckingham Palace	(2)	Rotating Pyramids	(1)
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